Phononic Self-Amplification in Saline Environments Under Conditions of High Magnetism and its Application for Water Desalination

6 July 2024
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Introduction

An increasing percentage of the world's population relies upon ocean water desalination for the generation of potable water as well as water suitable for crop irrigation. Distillation of water is an energy-intensive process. Barring a sudden increase in the availability of affordable energy (and even with such an advancement,) it will be desirable to elucidate a more efficient means of distillation.

Abstract

The solution to this problem may lie in phononic self-amplification. Whereas in most materials, phonons tend to dissipate both due to diffusion and conversion into heat, in saltwater, provided the presence of a magnetic field of sufficient intensity to force a particular orientation of water molecules and salt crystals, sound waves may, essentially, self-amplify.

Ordinarily, in a mixture of salt and water, the orientation of salt crystals and H2O molecules is haphazard with molecular activity being spurred only by the chance passage of salt crystals into the 'V' of the H2O molecules, leading to forceful repulsions (this being the reason for the lower freezing point of saltwater.) If, however, a series of these molecules were in rotational and positional alignment, then sound waves introduced to the fluid would result in not merely one salt crystal closely approaching an H2O molecule, but a chain reaction in which this happens hundreds of times for each aligned series. This chain reaction would begin with a salt crystal straying into the 'V' of an H2O and the H2O being forcefully repelled. It would then move toward a different salt crystal and, due to the controlled rotation and position, would be more likely to knock into the salt crystal directly and forcefully.

Whereas the magnetic fields would be responsible for maintaining rotational alignment, the pattern of the injected acoustic energy would be responsible for maintaining the positional alignment of columns of molecules. Alternation between a great many pairs of closely collocated emitters would cause the molecules of the saltwater solution to form columns.

A comparatively modest amount of acoustic input could be, therefore, expected to create sufficient heat and pressure so as to boil the water and facilitate the distillation process without conventional heating of the water.

Conclusion

Although permanent magnets would require a great deal of space, they could be manufactured synthetically and assembled incrementally. The larger a basin of water (i.e. the greater the range at which the effect could be maintained) which could be made to conform to such a pattern of orientation, the more practical this approach will prove to be.